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IS 11976 (1986): Sugarcane Planter, Semi-automatic [FAD 21: Farm Implements and Machinery]



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*Indian Standard*

SPECIFICATION FOR  
SUGARCANE PLANTER, SEMI-AUTOMATIC

UDC 631.332 : 635.323

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**BUREAU OF INDIAN STANDARDS**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

# *Indian Standard*

## SPECIFICATION FOR SUGARCANE PLANTER, SEMI-AUTOMATIC

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# *Indian Standard*

## SPECIFICATION FOR SUGARCANE PLANTER, SEMI-AUTOMATIC

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 27 October 1986, after the draft finalized by the Sowing, Fertilizer and Manure Application Equipment Sectional Committee had been approved by the Agricultural and Food Products Division Council.

**0.2** While quality seeds always ensure high crop yield, the method of planting the seeds in soil is equally important. Higher yields of Sugarcane and similar other crops can be obtained by planting the seeds at proper and uniform depth in lines. Planting helps in reducing the labour required for thinning of such crops. Sugarcane planting involves opening of the furrow, placement of the sugarcane sett and fertilizer, its covering and compacting. Traditionally sugarcane has always been planted manually, which is tedious, time consuming and expensive. To reduce the cost of planting, drudgery and for proper placement of sugarcane sett and fertilizer, sugarcane planters have been developed.

**0.3** Sugarcane planters are of two types, namely, drop type, and cutter type. A drop type planter opens the furrow, places setts and fertilizer and covers with soil. In the cutter type planter the whole sugarcane stem is fed and the planter cuts it to a predetermined length and carries it to the furrow.

**0.4** In view of the increasing manufacture and use of drop type planter in the country, a need was felt to prepare this standard. This standard specifies the requirements of drop type planters only.

**0.5** In preparation of this standard, assistance has been derived from Indian Institute of Sugarcane Research, Lucknow and Andhra Pradesh Agricultural University, Hyderabad.

**0.6** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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\*Rules for rounding of numerical values (*revised*).

## 1. SCOPE

**1.1** This standard specifies material, constructional, performance and other requirements of semi-automatic tractor drawn drop type sugarcane planters.

## 2. TERMINOLOGY

**2.0** For the purpose of this standard the following definitions shall apply.

**2.1 Sugarcane Planter** — An implement which opens the furrow, places sugarcane setts and fertilizer and covers with soil covers.

**2.1.1 Drop Type Planter** — A machine in which sugarcane setts of desired length are fed and dropped at pre-determined spacing.

**2.2 Sugarcane Sett** — Cut pieces of sugarcane of desired length.

**2.3 Uniformity of Sett Placement** — Placement of the pre-determined number of sugarcane setts of specified length over a pre-determined furrow length in a specified manner.

## 3. MATERIALS

**3.1** The materials for the construction of different components of the sugarcane planter shall be selected from those given in col 3 of Table 1. The material shall, as far as possible, conform to Indian Standard and Grade as given in col 4 and 5 of Table 1.

## 4. HARDNESS

**4.1** The furrow openers shall be hardened to have Brinell hardness between 350 and 450 HB when tested in accordance with IS : 1500-1983\*.

## 5. CONSTRUCTIONAL REQUIREMENTS

**5.1 Frame** — Shall be rigid and strong.

**5.2 Wheels** — Wheels shall have either bushes or dust proof bearings with provisions for lubrication.

**5.3 Axles and Shafts** — Axles and shafts shall be so attached that they can be easily removed for cleaning when required.

**5.4 Sett Box** — Sett box shall have adequate capacity and may be trapezoidal or rectangular. The box shall be sufficiently strong and shall not buckle when fully filled with sugarcane setts.

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\*Method for Brinell hardness test for metallic materials (second revision).



TABLE 1 MATERIAL FOR CONSTRUCTION OF DIFFERENT COMPONENTS OF PLANTER

( Clause 3.1 )

SL No.	COMPONENT	MATERIAL	APPLICABLE STANDARD	GRADE
(1)	(2)	(3)	(4)	(5)
i)	Frame	Mild steel	IS : 226-1975*	—
ii)	Wheel	Mild steel	IS : 226-1975*	—
		Cast iron	IS : 210-1978†	FG 200
		Pneumatic tyre	—	—
iii)	Axle and shaft	Mild steel	IS : 226-1975*	—
iv)	Sugarcane sett and fertilizer boxes	Mild steel	IS : 226-1975*	—
		Galvanized steel sheet	IS : 277-1985‡	—
		Plastics	—	—
		Fibreglass	—	—
v)	Tines	Mild steel	IS : 226-1975*	—
		Carbon steel	IS : 1570 ( Part 2 )-1979§	C55 Mn75
vi)	Furrow opener	High carbon steel	IS : 1570 ( Part 2 )-1979§	C75
vii)	Sett feeding drum	Galvanized steel sheet	IS : 277-1985‡	—
		Mild steel	IS : 226-1975*	—
viii)	Sett carrying chute	Mild steel	IS : 226-1975*	—
		Plastics	—	—
ix)	Fertilizer metering mechanism	Cast iron	IS : 210-1978†	FG 200
		Mild steel	IS : 226-1975*	—
		Aluminium	IS : 617-1975	A-4M
		Plastics	—	—
x)	Bushes	Brass	IS : 292-1983¶	3
		Gun metal	IS : 306-1983**	—
		Nylon	—	—
xi)	Covering device	Mild steel	IS : 226-1975*	—
		Cast iron	IS : 210-1978†	FG 200
xii)	Pulley, sprocket and gear	Cast iron	IS : 210-1978†	FG 200
		Mild steel	IS : 226-1975*	—
xiii)	Hitching mechanism	Mild steel	IS : 226-1975*	—
xiv)	Feed adjusting mechanism	Mild steel	IS : 226-1975*	—
		Cast iron	IS : 210-1978†	FG 200
xv)	Depth adjusting mechanism	Mild steel	IS : 226-1975*	—
		Cast iron	IS : 210-1978†	FG 200
xvi)	Compacting roller	Cast iron	IS : 210-1978†	FG 200
xvii)	Marker	Mild steel	IS : 226-1975*	—
xviii)	Seat	Mild steel	IS : 226-1975*	—
xix)	Foot rest	Mild steel	IS : 226-1975*	—

( Continued )

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**TABLE 1 MATERIAL FOR CONSTRUCTION OF DIFFERENT COMPONENTS OF PLANTER — Contd**

\*Specification for structural steel ( standard quality ) ( *fourth revision* ).

†Specification for grey iron castings ( *third revision* ).

‡Specification for galvanized steel sheets ( plain and corrugated ) ( *fourth revision* ).

§Schedules for wrought steels for general engineering purposes:

Part 2 Carbon steels ( unalloyed steels ) ( *first revision* ).

||Specification for aluminium and aluminium alloy ingots and castings for general engineering purposes ( *second revision* ).

¶Specification for leaded brass ingots and castings ( *second revision* ).

\*\*Specification for tin bronze ingots and castings ( *third revision* ).

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**5.4.1** The thickness of mild steel and galvanized steel sheet for boxes shall be not less than 1.0 and 0.63 mm respectively.

**5.5 Tines** — Tines shall be properly attached with tool bar either by bolts or by clamps.

**5.6 Furrow Openers** — Furrow openers shall be provided with depth adjustment arrangement and may be of ridger type with adjustable wings. There may be different furrow openers for sett and fertilizer or common for sett and fertilizer with the provision of dropping them separately.

**5.7 Sett Feeding Drum** — The sett feeding drum shall have 12 or more sett compartments to distribute the sugarcane setts uniformly while operating at a forward speed of 1.5 km/h.

**5.8 Fertilizer Box** — The fertilizer box shall have adequate capacity and may be trapezoidal. The box shall be sufficiently strong and shall not buckle when fully filled with fertilizer.

**5.8.1** The thickness of mild steel and galvanized steel sheet for boxes shall be not less than 1.0 and 0.63 mm respectively.

**5.9 Fertilizer Metering Mechanism** — The fertilizer metering mechanism shall be of gravity feed system with agitator or positive metering type.

**5.10 Sett Carrying Chute** — The sugarcane sett carrying chute shall be sufficiently wide at the lower end to ensure smooth drop of setts. The lower end of the chute shall be 10 cm above the ground level and the inclination of the chute shall be 10 to 15°.

**5.11 Covering and Compacting Device** — The setts shall be covered by covering tines with shovels followed by compacting rollers. The depth of covering shall be adjustable.

**5.12 Marker** — A marker shall be provided on the machine to guide the tractor driver in maintaining uniform row to row spacing.

**5.13 Transmission System** — This may be sprocket and chain or gear type with proper guards. Provisions for adjustment of chain shall be provided.

## 6. PERFORMANCE REQUIREMENTS

**6.1** The variation in dropping of setts and fertilizer in different feeding outlets separately shall be not more than 5 and 12.5 percent, respectively, from the average quantity obtained.

**6.2** The variation in number/quantity dropped per hectare and number/quantity specified to be dropped at a particular setting shall be not more than 7 and 12.5 percent for setts and fertilizer respectively.

**6.3** The variation in uniformity of sett dropping and placement at a forward speed of 1.5 km/h shall not exceed 10 percent.

**6.4** The bud damage shall not exceed 2 percent.

**6.5** The wheel slip at specified speed shall not exceed 10 percent.

**6.6** The variation in dropping of fertilizer due to box filling at  $\frac{1}{4}$ ,  $\frac{1}{2}$  and  $\frac{3}{4}$  of rated capacity shall not exceed by 10 percent.

**6.7** The planter shall be able to plant the setts up to a depth of 20 cm.

**6.8** The above requirements shall be tested in accordance with IS : 9856-1981\* as detailed below:

Performance Requirements (Ref to Cl No. in this Standard)	Method of Test Ref to Cl No. of IS : 9856-1981*	
	Type Testing	Routine Testing
	(2)	(3)
(1)		
6.1 & 6.2	6.2.1 and 7.3.1	6.2.1
6.3	7.3.1	7.3.1
6.4	6.3	6.3
6.5	7.3.2.1 and 7.3.2.2	—
6.6	6.2.2	—
6.7	7.3.1	—

## 7. OTHER REQUIREMENTS

**7.1** The row spacing shall be adjustable between 60 to 90 cm.

\*Test code for potato planters.

**7.2** An etched metallic calibration plate indicating the metering position and quantity of fertilizer shall be attached under the top cover of fertilizer box.

**7.3** Arrangement for quick cut-off of the fertilizer when the planter is moving, shall be provided. This arrangement shall work without disturbing the setting of metering mechanism.

**7.4** Hitching arrangement shall conform to the three point linkage specified in IS : 4468-1986\*.

**7.5** Proper lubrication arrangements shall be provided for all moving parts except the portions exposed to sets and fertilizer.

**7.6** Each planter shall be provided with instruction sheets containing full information on method of installation and operation of the planter. It shall also be provided with a manual on installation and operation containing maintenance instructions, calibration chart, etc.

**7.6.1** Each planter shall also be supplied with necessary tools.

**7.6.2** Each planter shall be provided with the following accessories.

- a) Pesticides tank,
- b) Foot rest,
- c) Compacting roller,
- d) Levelling device, and
- e) Area recorder.

## **8. WORKMANSHIP AND FINISH**

**8.1** The welding shall be satisfactory in all respects and shall not be brittle or porous.

**8.2** The components shall be free from rust and shall have a protective coating to prevent surface deterioration in transit and storage.

**8.3** The components shall be free from pits, burrs and other defects that may be detrimental for their use.

## **9. MARKING AND PACKING**

**9.1 Marking** — Each planter shall be marked with the following particulars:

- a) Manufacturer's name and trade mark, if any; and
- b) Model, Code and serial number.

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\*Dimensions for three-point linkage of agricultural wheeled tractors ( *second revision* ).

**9.1.1** Each planter may also be marked with the Standard Mark.

**NOTE** — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

**10. TESTS**

**10.1** One planter of each model shall be tested for all the requirements mentioned in this standard.

**10.2** Each planter of a model shall be tested for requirements mentioned in 6.1 to 6.4, 7.1 to 7.5 and 8.1 to 8.3.

**10.3** The testing of the sugarcane planter shall be done in accordance with IS : 9856-1981\*.

**11. SAMPLING**

**11.1** Unless otherwise agreed to between the purchaser and the supplier, the sampling of the planter for lot acceptance shall be done in accordance with IS : 7201-1974†.

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\*Test code for potato planters.

†Method for sampling of agricultural machinery and tractors.

# INTERNATIONAL SYSTEM OF UNITS ( SI UNITS)

## Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

## Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

## Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s <sup>2</sup>
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m <sup>2</sup>
Frequency	heriz	Hz	1 Hz = 1 c/s (s <sup>-1</sup> )
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m <sup>2</sup>